

# Disparities in First Dose COVID-19 Vaccination Coverage among Children 5–11 Years of Age, United States

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We analyzed first-dose coronavirus disease vaccination coverage among US children 5–11 years of age during November–December 2021. Pediatric vaccination coverage varied widely by jurisdiction, age group, and race/ethnicity, and lagged behind vaccination coverage for adolescents aged 12–15 years during the first 2 months of vaccine rollout.

Although more common among adults, severe coronavirus disease (COVID-19) and hospitalization can occur in children. Among >8,300 hospitalized children 5–11 years of age, 1/3 required intensive care (1,2). Children can transmit severe acute respiratory syndrome coronavirus 2 to others, highlighting the need for pediatric COVID-19 vaccinations. On November 2, 2021, the US Centers for Disease Control and Prevention (CDC) recommended the use of the Pfizer-BioNTech COVID-19 vaccine (Pfizer Inc., <https://www.pfizer.com>) in children 5–11 years of age. We analyzed first-dose vaccination coverage among children 5–11 years of

age and stratified coverage by age group, sex, race/ethnicity, and jurisdiction.

## The Study

We analyzed COVID-19 vaccine administration data among children 5–11 years of age in the United States during November 2–December 31, 2021. We collected data that were reported to CDC from jurisdictions, pharmacies, and federal entities through immunization information systems, the Vaccine Administration Management System, and direct data submission by January 21, 2022 (Appendix, <https://wwwnc.cdc.gov/EID/article/28/5/22-0166.pdf>). We calculated daily and cumulative total numbers of children receiving the first dose of Pfizer-BioNTech COVID-19 vaccine. We calculated vaccination coverage by dividing the number of children who received the first vaccine dose by the total population of children in the corresponding age group living in the defined jurisdiction. We stratified vaccine coverage by jurisdiction, age group (5–6, 7–8, and 9–11 years), and sex. We obtained the population size for children 5–11 years of age from the US Census Bureau 2020 Population Estimates (3). Among 82.1% of children 5–11 years of age for whom race and ethnicity data were available, we calculated the percentage of children receiving their first COVID-19 vaccine dose by race/ethnicity and compared this with the racial and ethnic makeup of the US population 5–11 years of age.

We did not conduct tests for statistical significance because these data reflect US population and not population samples. We used SAS version 9.4 (SAS Institute, Inc., <https://www.sas.com>) to perform analyses. This study was reviewed by CDC and conducted consistent with applicable federal law and CDC policy.

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Overall, 24.0% of US children 5–11 years of age received their first COVID-19 vaccine dose during November–December 2021, and rapid initial uptake occurred during the first 2 weeks after CDC recommended the vaccine (Figure 1). Vaccination coverage varied by jurisdiction, ranging from 9.1% in Mississippi to 56.4% in Vermont. Coverage also varied by age group and was higher for children 9–11 years of age (26.8%) than children 5–6 years of age (20.3%) or 7–8 years (23.5%) (Figures 1, 2). Vaccination coverage did not vary by sex, 23.7% coverage for male children and 24.1% for female children (Appendix Table).

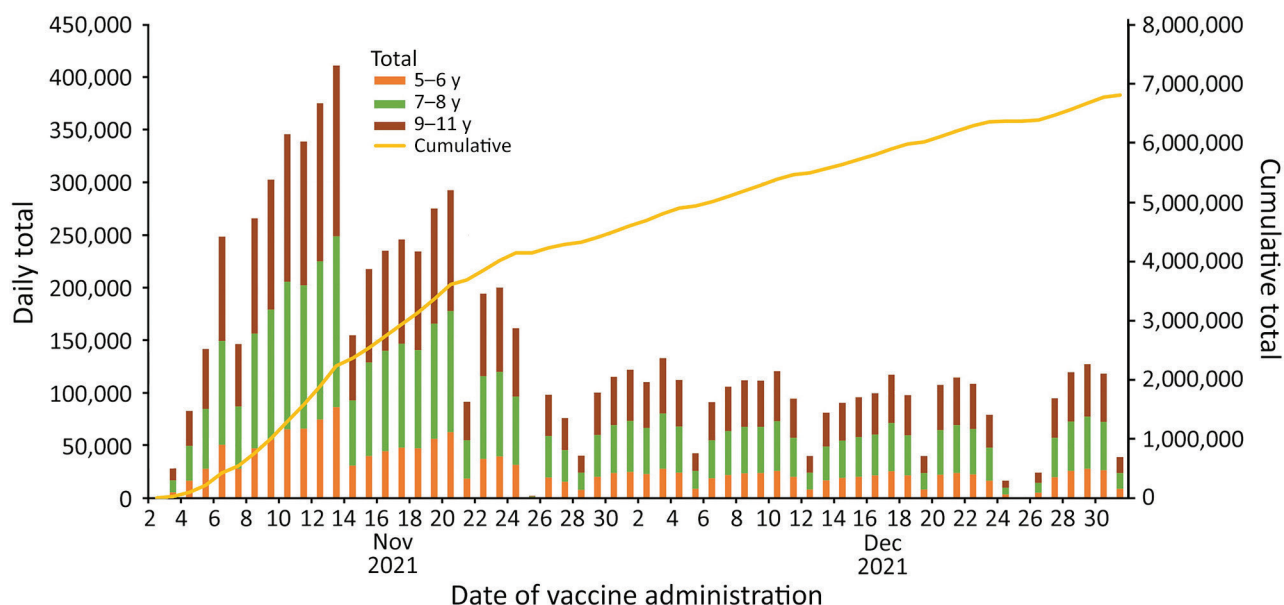
Among all US children 5–11 years of age, non-Hispanic White persons constitute 51.2% of the population, non-Hispanic Black 14.0%, and Hispanic/Latino 23.0% (3). However, children from these groups were underrepresented among those reporting a first COVID-19 vaccination dose; only 49.1% non-Hispanic White, 8.0% non-Hispanic Black, and 21.7% Hispanic/Latino children were vaccinated. In contrast, among vaccine recipients, 11.4% were non-Hispanic Asian children, but this group constitutes only 5.6% of the US population 5–11 years of age (Appendix Figure).

## Conclusions

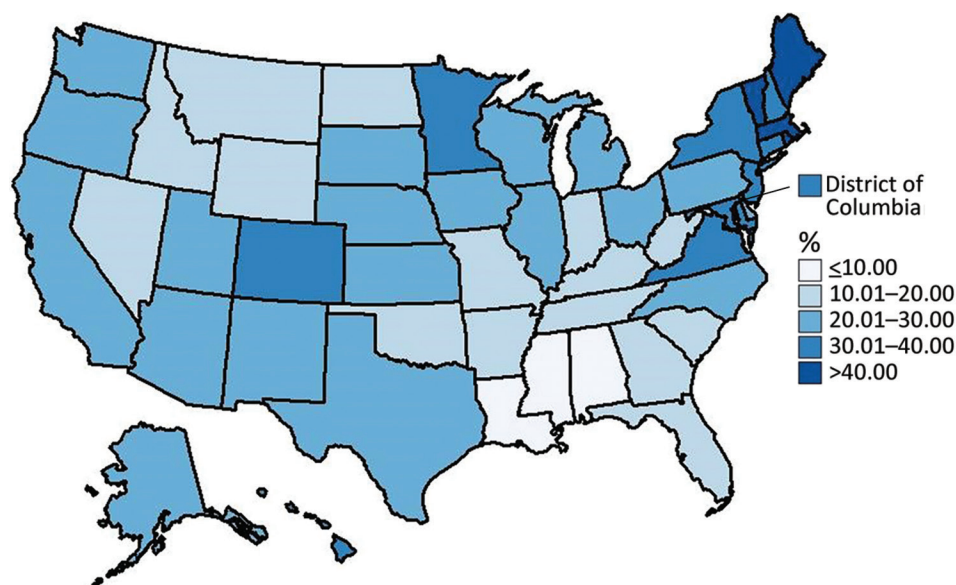
Vaccination coverage among children 5–11 years of age was only 24% and lagged vaccination coverage among children 12–15 years of age (33.3%) during the first 2 months of vaccine rollout (4). Many disparities among children 5–11 years of age emerged

during the first 2 months of vaccine rollout, including racial and ethnic disparities. Children of Asian descent were overrepresented and White, Black, and Hispanic children were underrepresented. Many factors could explain these disparities. For instance, Asian Americans are less likely to live in poverty overall compared with other racial and ethnic groups (5). Poverty rates among Black (19.5%) and Hispanic (17.0%) communities are among the highest in the country (6), and lower income parents face challenges taking leave from work to get their children vaccinated or to care for children who have vaccine side effects (7).

Other factors that could hinder lower income parents from seeking vaccinations for their children include transportation challenges, a lack of pediatric and family medicine practices that serve as medical homes for routine pediatric care, and higher COVID-19 vaccine hesitancy among some parents (8,9). Access to a medical home could help address parental concerns about COVID-19 vaccines and improve vaccination uptake among pediatric populations. In addition, parental COVID-19 vaccination hesitancy varies by socioeconomic factors and is higher among parents whose children are publicly insured, such as through Medicaid, and parents in lower income social groups (9). Many factors influence parental hesitancy and additional concerted public health efforts to inform and educate parents and caregivers are needed to improve confidence in COVID-19 vaccines (10).



**Figure 1.** Daily and cumulative totals of the number of children 5–11 years of age who received the first dose of the Pfizer-BioNTech COVID-19 vaccine (Pfizer Inc., <https://www.pfizer.com>) by date of vaccination and age group, United States, November 2–December 31, 2021.



**Figure 2.** Percentage of vaccination coverage among children 5–11 years of age who received the first dose of the Pfizer-BioNTech COVID-19 vaccine (Pfizer Inc., <https://www.pfizer.com>), by jurisdiction, United States, November 2–December 31, 2021.

We found pediatric COVID-19 vaccination coverage varied widely across the United States and some jurisdictions had substantially higher vaccination coverage than others. Jurisdictions in the Northeast, including Vermont, Maine, Massachusetts, and Rhode Island, were among those with the highest vaccination coverage, and jurisdictions in the South, including Louisiana, Mississippi, and Alabama, were among those with the lowest coverage rates. This geographic variation could reflect parental vaccination status because adult vaccination coverage in the United States varied in a similar pattern (4). Parental COVID-19 vaccination status is one of the strongest predictors of pediatric COVID-19 vaccination (11), and efforts to build parental trust in COVID-19 vaccines are needed.

Furthermore, overall COVID-19 vaccination uptake among children 5–11 years of age was higher among children 9–11 years of age than children 5–6 years of age. The reasons for differences in vaccination coverage between the older and younger children are unknown but could reflect variations in parental hesitancy based on children's ages. In a recent survey of parents of children 2–17 years of age, the younger the child, the less willing the parents were to vaccinate immediately (11). Among surveyed parents of children 5–11 years of age, 27% said they would get their children vaccinated for COVID-19 right away, but 33% said they would wait and see, 5% said they would only vaccinate if required, and 30% said they would definitely not get their children vaccinated (7).

CDC recommends that everyone  $\geq 5$  years of age receive COVID-19 vaccination to reduce illness and

death (12). Pediatric and family medicine practices that serve as medical homes, along with pharmacies and other providers, should continue to promote and offer COVID-19 vaccines to children. Vaccination clinics hosted by schools, in collaboration with a vaccinating partner like a pharmacy or public health department, also might make vaccination convenient and help increase uptake of COVID-19 vaccination among children as they have done for routine vaccinations (13–15).

Our findings have  $\geq 2$  limitations. First, missing data on race and ethnicity for 17.9% of the records could bias findings by race/ethnicity, especially if differential reporting bias based on jurisdictions or by racial or ethnic subgroups occur. In addition, the US Census does not include a race category for "Other" as noted for many jurisdictions in immunization information systems. This finding could affect the interpretation of proportions for the "Multiple/Other, non-Hispanic" category because combining "Other" with "Multiple" in the immunization records could overrepresent vaccination coverage for this category. Finally, we calculated age for 14 jurisdictions where complete date of birth was unknown, which could have misclassified some age groups.

In conclusion, we found COVID-19 vaccination coverage among children 5–11 years of age varied substantially by jurisdiction, age group, and race or ethnicity. To ensure equity, jurisdictions nationwide should devise and implement strategic efforts to strengthen vaccination programs to build vaccine confidence and reduce barriers to receiving COVID-19 vaccines.

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Dr. Murthy is a Lieutenant Commander in the US Public Health Service and serves as a medical officer in the Immunization Services Division, National Center for Immunization and Respiratory Diseases, at the US Centers for Disease Control and Prevention in Atlanta, Georgia, USA, and is currently deployed on CDC's COVID-19 Response Vaccine Task Force. His research interests focus on the intersection of medicine, public health, and health communications.

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# Disparities in First-Dose COVID-19 Vaccination Coverage among Children 5–11 Years of Age, United States

## Appendix

### Data Sources

Immunization information systems are confidential, computerized, population-based systems that collect and consolidate vaccination data from providers in 64 public health jurisdictions and can be used to track administered vaccines and measure vaccination coverage. The 64 jurisdictions of these systems comprise the 50 US states, 8 US territories and freely associated states (Puerto Rico, US Virgin Islands, American Samoa, Commonwealth of the Northern Mariana Islands, Guam, Marshall Islands, Palau, and the Federated States of Micronesia), and 6 local jurisdictions (Chicago, Illinois; Houston and San Antonio, Texas; Philadelphia, Pennsylvania; New York City, New York; and Washington, DC).

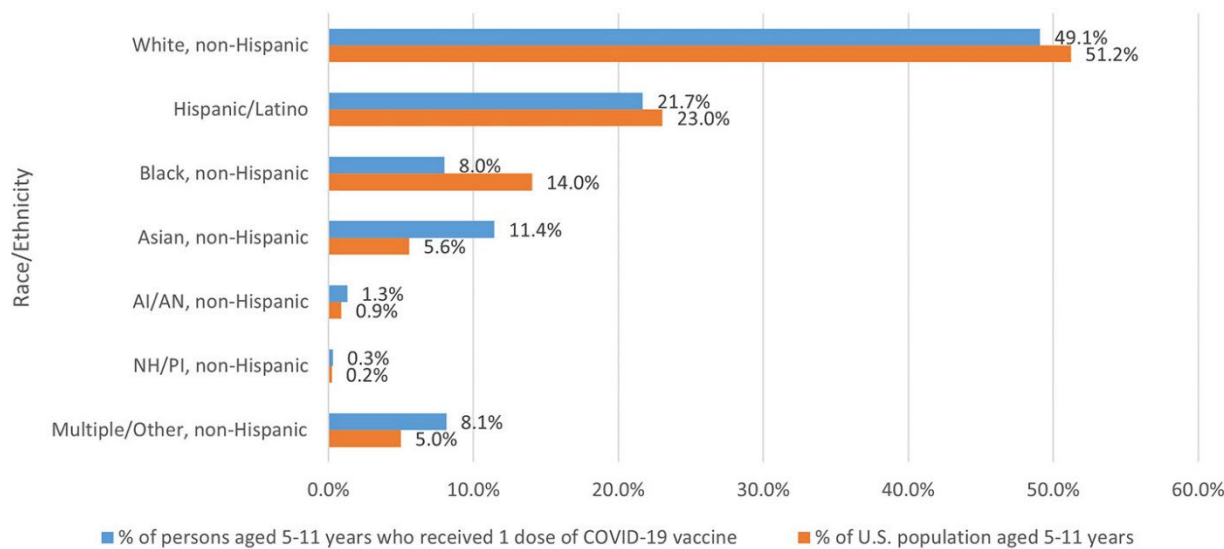
The Centers for Disease Control and Prevention developed the Vaccine Administration Management System as a secure, online tool to manage vaccine administration from the time the vaccine arrives at a clinic until it is administered to a recipient (<https://www.cdc.gov/vaccines/covid-19/reporting/vams/program-information.html>). Direct data submission to the Centers for Disease Control and Prevention was available through the COVID-19 Vaccine Overview website (<https://www.cdc.gov/vaccines/covid-19/reporting/overview/IT-systems.html>).

**Appendix Table.** Vaccination coverage among children 5–11 years of age who received their first dose of the Pfizer-BioNTech COVID-19 vaccine, by jurisdiction, age group, and sex, United States, November 2–December 31, 2021\*  
No. vaccinated (%)

Jurisdiction	Total	Sex		Age group, y		
		F	M	5–6	7–8	9–11
United States	6,808,535 (24.0)	3,347,448 (24.1)	3,439,416 (23.7)	1,640,406 (20.3)	1,897,180 (23.5)	3,270,949 (26.8)
Alabama	39,688 (9.4)	19,782 (9.6)	19,886 (9.3)	8,747 (7.3)	10,776 (9.1)	20,165 (11.1)
Alaska	15,861 (22.2)	7,862 (22.5)	7,785 (21.3)	3,800 (18.4)	4,357 (21.1)	7,704 (25.4)
Arizona	144,286 (22.4)	71,224 (22.5)	72,968 (22.2)	34,460 (18.7)	40,485 (22.1)	69,341 (25.0)
Arkansas	42,701 (15.7)	20,510 (15.5)	20,784 (14.9)	9,639 (12.4)	11,880 (15.4)	21,182 (18.1)
California	962,980 (27.9)	477,893 (28.4)	484,187 (27.5)	221,394 (22.5)	266,092 (27.1)	475,494 (32.1)
Colorado	154,687 (31.7)	75,843 (31.9)	78,642 (31.6)	39,284 (28.6)	43,183 (31.5)	72,220 (33.9)
Connecticut	105,221 (38.3)	51,873 (38.5)	53,068 (37.9)	25,445 (33.3)	29,262 (37.8)	50,514 (41.7)
Delaware	19,046 (23.9)	9,493 (24.3)	9,540 (23.5)	4,684 (20.8)	5,210 (23.0)	9,152 (26.5)
District of Columbia	19,502 (37.3)	9,699 (37.5)	9,775 (37.0)	5,872 (36.0)	5,630 (35.9)	8,000 (39.5)
Florida	278,706 (16.9)	138,052 (17.1)	140,543 (16.7)	61,746 (13.1)	76,279 (16.2)	140,681 (19.8)
Georgia	140,352 (14.5)	69,593 (14.6)	70,374 (14.3)	32,320 (11.8)	38,792 (14.1)	69,240 (16.4)
Hawaii	39,104 (32.8)	19,002 (32.8)	20,054 (32.7)	8,535 (24.5)	10,751 (30.5)	19,818 (40.2)
Idaho	26,078 (14.7)	12,885 (14.9)	13,159 (14.6)	6,262 (12.6)	7,167 (14.4)	12,649 (16.4)
Illinois	319,100 (29.7)	156,511 (29.8)	162,354 (29.6)	76,586 (25.1)	88,965 (29.3)	153,549 (33.0)
Indiana	99,047 (16.3)	48,335 (16.3)	50,596 (16.2)	23,962 (13.8)	27,470 (15.8)	47,615 (18.2)
Iowa	62,142 (22.0)	30,527 (22.2)	31,487 (21.8)	15,613 (19.2)	17,554 (22.0)	28,975 (23.9)
Kansas	60,150 (22.0)	29,979 (22.4)	30,090 (21.5)	14,809 (19.2)	16,874 (21.7)	28,467 (24.0)
Kentucky	66,876 (17.2)	32,660 (17.3)	33,883 (17.0)	15,984 (14.3)	18,524 (16.7)	32,368 (19.5)
Louisiana	39,960 (9.5)	19,763 (9.6)	20,185 (9.4)	9,460 (7.7)	11,042 (9.3)	19,458 (10.8)
Maine	38,789 (40.7)	18,989 (40.9)	19,369 (39.7)	9,821 (36.6)	10,911 (40.5)	18,057 (43.5)
Maryland	181,843 (34.9)	89,720 (35.3)	91,853 (34.5)	45,664 (30.8)	50,837 (34.4)	85,342 (38.0)
Massachusetts	227,664 (44.1)	111,314 (44.1)	116,145 (44.1)	56,068 (38.5)	64,114 (43.6)	107,482 (48.2)
Michigan	185,024 (22.5)	90,830 (22.7)	94,155 (22.4)	46,432 (19.8)	51,464 (22.1)	87,128 (24.6)
Minnesota	163,829 (32.2)	79,866 (32.1)	82,685 (31.7)	41,374 (28.3)	46,727 (32.2)	75,728 (34.7)
Mississippi	24,165 (9.1)	12,064 (9.2)	12,080 (8.9)	5,159 (6.9)	6,391 (8.5)	12,615 (10.8)
Missouri	98,341 (18.5)	48,198 (18.6)	50,103 (18.4)	24,562 (16.2)	27,359 (18.1)	46,420 (20.3)
Montana	18,153 (20.0)	8,815 (20.0)	9,194 (19.7)	4,550 (17.4)	5,045 (19.5)	8,558 (22.0)
Nebraska	43,822 (23.5)	21,314 (23.6)	22,442 (23.4)	10,856 (20.1)	12,498 (23.7)	20,468 (25.8)
Nevada	40,480 (14.8)	20,031 (15.0)	20,446 (14.6)	8,816 (11.3)	11,123 (14.4)	20,541 (17.3)
New Hampshire	31,509 (32.5)	15,462 (32.7)	15,880 (31.9)	7,700 (28.7)	8,743 (31.8)	15,066 (35.2)
New Jersey	230,176 (30.8)	113,424 (31.0)	116,409 (30.5)	55,503 (26.3)	63,559 (29.9)	111,114 (34.3)
New Mexico	54,095 (29.1)	26,311 (28.8)	26,871 (28.4)	12,895 (24.9)	14,783 (28.1)	26,417 (32.3)
New York	485,354 (31.4)	236,785 (31.3)	245,536 (31.0)	118,709 (26.6)	133,969 (30.2)	232,676 (35.4)
North Carolina	199,406 (22.3)	97,743 (22.3)	100,459 (22.1)	47,202 (18.7)	55,448 (22.0)	96,756 (24.9)
North Dakota	12,845 (17.9)	6,236 (17.6)	6,532 (17.9)	3,148 (14.6)	3,719 (18.1)	5,978 (20.1)
Ohio	202,458 (20.3)	99,100 (20.4)	102,832 (20.2)	50,609 (17.7)	56,871 (20.0)	94,978 (22.3)

Jurisdiction	No. vaccinated (%)					
	Total	Sex		Age group, y		
		F	M	5–6	7–8	9–11
Oklahoma	51,704 (13.7)	25,537 (13.9)	26,158 (13.6)	12,206 (11.4)	14,303 (13.3)	25,195 (15.6)
Oregon	95,450 (28.1)	46,536 (28.1)	48,725 (27.9)	23,365 (24.2)	26,992 (28.0)	45,093 (30.6)
Pennsylvania	276,053 (27.1)	132,967 (26.7)	136,861 (26.3)	68,778 (23.8)	77,570 (26.7)	129,705 (29.6)
Rhode Island	33,754 (43.8)	16,818 (44.8)	16,885 (42.8)	8,295 (37.6)	9,388 (42.8)	16,071 (48.8)
South Carolina	60,960 (13.9)	30,292 (14.1)	30,599 (13.8)	13,799 (11.2)	16,729 (13.6)	30,432 (15.9)
South Dakota	18,936 (22.1)	9,294 (22.3)	9,428 (21.4)	4,591 (18.5)	5,291 (21.7)	9,054 (24.8)
Tennessee	77,516 (13.3)	38,200 (13.4)	39,259 (13.2)	18,636 (11.2)	21,595 (13.0)	37,285 (14.9)
Texas	606,580 (20.7)	299,641 (20.9)	306,712 (20.6)	146,478 (17.4)	170,448 (20.6)	289,654 (23.0)
Utah	96,237 (26.4)	47,333 (26.6)	48,815 (26.1)	23,797 (23.1)	27,090 (26.3)	45,350 (28.6)
Vermont	24,759 (56.4)	12,011 (57.0)	12,727 (55.8)	6,314 (51.0)	7,000 (56.1)	11,445 (60.2)
Virginia	241,733 (33.4)	118,593 (33.5)	122,992 (33.2)	57,781 (27.9)	68,150 (33.0)	115,802 (37.3)
Washington	197,138 (29.9)	96,757 (30.0)	99,850 (29.6)	50,665 (26.8)	55,679 (29.6)	90,794 (32.2)
West Virginia	20,661 (14.8)	10,124 (14.8)	10,257 (14.3)	4,536 (11.4)	5,755 (14.3)	10,370 (17.3)
Wisconsin	126,851 (26.0)	62,341 (26.2)	64,353 (25.8)	31,884 (23.2)	35,470 (25.7)	59,497 (28.0)
Wyoming	6,763 (12.9)	3,316 (13.0)	3,444 (12.7)	1,611 (11.0)	1,866 (12.6)	3,286 (14.2)

\*Persons with state of residence reported as “unknown” (n = 10,591) were excluded from the table. Persons with sex reported as “unknown” (n = 21,671) were not represented in male and female counts (5–6 y, n = 6,642; 7–8 y, n = 5,748; 9–11 y, n = 9,281). COVID-19, coronavirus disease.



**Appendix Figure.** Race and ethnicity of children 5–11 years of age who received the first dose of the Pfizer-BioNTech COVID-19 vaccine (Pfizer Inc., <https://www.pfizer.com>), United States, November 2–December 31, 2021. Race and ethnicity information was available for 82.1% of persons included in the analysis. Of note, “Multiple/Other, non-Hispanic” represents persons identified as being non-Hispanic and having multiple race categories selected or being non-Hispanic and having “other” race selected. The US Census does not include “Other” as a race category, but many immunization information system jurisdictions might report “Other,” which could affect the interpretation of proportions for this category. AI/AN, American Indian/Alaska Native; NH/PI, Native Hawaiian or Other Pacific Islander.